ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 07 | July - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE OF MICROORGANISMS ASSOCIATED WITH VAGINAL INFECTIONS IN WOMEN OF REPRODUCTIVE AGE GROUP AND ITS ANTIMICROBIAL RESISTANCE PATTERN

Microbiology

Dr. Babita Kumari Assistant Professor, Department Of Microbiology, Patna Medical College, Patna, Bihar
Dr. Spriha Smriti Assistant Professor, Department Of Microbiology, Patna Medical College, Patna, Bihar
Dr. Vijay Kumar Professor, Department Of Microbiology, Patna Medical College, Patna, Bihar

ABSTRACT

Introduction: Vaginitis is the inflammation and infection of vagina commonly encountered in clinical medicine. These infections if not treated or ignored would debilitate the patients and could become a source of infection for the neonates especially in case of women belonging to the childbearing age. **Material and methods:** 120 samples of high vaginal swab were taken from clinically suspected cases of Vaginitis. Samples were examined in the Microbiology department. All samples were examined for any bacterial isolate by means of Gram's staining, motility test and biochemical tests. **Results:** Out of 120 cases of vaginitis, bacteria were isolated from 82 cases i.e. significant growth obtained from 68.33% cases. In our study gram negative bacilli were isolated in preponderance than gram positive cocci. Among gram negative bacilli the commonest isolate was E. coli (29.26%), followed by Staphylococcus aureus (23.17%) and Klebsiella spp (14.63%). The antibiotic sensitivity pattern of the bacteria were also studied. **Conclusion:** Maintaining a healthy vaginal environment is considered a challenge worldwide. To prevent risk of infection, health care professionals should consider enhancing education to improve women's knowledge of reproductive health.

KEYWORDS

vaginitis, high vaginal swab, resistance pattern

INTRODUCTION

Vaginitis is an inflammation of the vagina in which bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis are the most common vaginitides.(1) Vaginitis is a common medical complaint in women of reproductive age group. Although the prevalence of bacterial vaginosis differs widely from country to country within the same region and even within similar population groups, it has been estimated to be in the range of 8% to 75%.(2) The vagina and its unique microflora form a finely balanced ecosystem, with the vaginal environment controlling the microbial strains present and the microflora in turn controlling the vaginal environment.(3) The vaginal microbial ecosystem is balanced by a predominance of protective lactobacilli. However, the microflora is not a static population but rather a dynamic state where types and population levels detected continuously fluctuate within the changing environment.(4) When there is a shift in this balance and overgrowth of vaginal anaerobes or gram negative bacteria result in infection and malodorous discharge from the vagina.

Abnormal vaginal discharge differs in color and consistency (thin, thick, frothy, yellow, green, gray or white) compared with physiological discharge, and frequently it is associated with other symptoms, including itching, fishy, and foul smelling.(5) Abnormal discharge is typically caused by vaginal infections, although some relatively common non-infectious etiologies occur as well(6). The vaginal flora varied based on different factors such as pH, glycogen content, vascularity of vagina, hormonal status, use of oral contraceptives, smoking and bad habits in terms of hygiene.

Whether infections or not, vaginitis possesses one of the most common problems in gynaecology and is one of the main reasons leading the females to seek advice from physician approximately 10 million office visits annually (7,8,9). Pathogens commonly implicated in aerobic vaginitis are particularly E. coli, Klebsiella spp, Pseudomonas spp, Staphylococcus aureus, Enterococcus spp, Mycoplasma hominis, Ureaplasma urealyticum etc.

The aim of the study is to isolate and identify the aerobic bacterial pathogens causing vaginitis in the reproductive age group of women and to study their antibiogram.

MATERIALS AND METHODS

This study was carried out in the Department of microbiology, Patna medical College, Patna. 120 cases selected for this study were taken from OPD of the Department of obstetrics and gynaecology, PMCH, Patna from October 2017 to March 2018.

Vaginal swabs were taken from females from age group of 15 to 45 years with symptomatic vaginal discharge. High vaginal swabs were collected. Then the specimen were examined by direct microscope and then put up for culture. The samples were inoculated on nutrient agar, Blood agar and MacConkey agar plates with gentle surface streaking. These culture medias were then incubated at 37°C for 24- 48 hours. After 24 hours of incubation, isolated colonies were picked up and Gram's staining was done. Motility test and other biochemical tests were done for further identification of bacterial isolates.

Wet mount preparation was made for isolation of Trichomonas vaginalis. Germ tube test was performed for isolation of Candida.

RESULTS

Out of 120 cases of vaginitis, bacteria were isolated from 82 cases i.e. significant growth obtained from 68.33% cases. 38 cases were found sterile. Out of 82 positive cases, 72 cases (87.80%) were positive for aerobic bacterial isolates, 9 (10.97%) cases showed cases of Candida and 1 case (1.21%) found of Trichomonas vaginalis. In our study, the highest frequency of infection was observed at 25 to 30 years followed by 31 to 35 years of age group.

In this study gram-negative bacilli were isolated more frequently than gram positive cocci. The commonest isolate was Escherichia coli with 24 case (29.26%), followed by Staphylococcus spp with 19 cases (23.17%), followed by Klebsiella spp with 12 cases(14.63%),

Coagulase negative Staphylococcus aureus with 7 cases (8.53%), Pseudomonas spp with 5 cases (6.09%,), Acinetobacter spp with 4 cases (4.87%), then Proteus spp with 1 case (1.21%).

Table-1

Distribution of organisms isolated from vaginal infections			
S.No	Aerobic isolates	No.of isolates	Percentage(%)
1	Escherichia coli	24	29.26
2	Staphylococcus aureus	19	23.17
3	Klebsiella spp.	12	14.63
4	Coagulase-negative Staphylococcus spp.	7	8.53
5	Pseudomonas aeruginosa	5	6.09
6	Acinetobacter spp.	4	4.87
7	Proteus spp.	1	1.21
8	Candida spp.	9	10.97
9	Trichomonas	1	1.21
	Total	82	100

In this study, among gram positive organisms Staphylococcus aureus and CONS were 100% sensitive for Vancomycin and Linezolid. The gram-positive organisms showed maximum resistance to Ampicillin followed by Erythromycin and Gentamycin. (Table II)

Table-II

Antibiotic Resistance Pattern of Gram Positive Cocci (% of Resistance)

Name of organisms	Antibiotics (% of Resistance)								
	E	AZ	AMP	CIP	AMC	G	CTR	V	LZ
Staphylococcus aureus	32	60	72	46	11	40	20	-	-
CONS	55	-	58	-	8	34	-	-	-
E-Erythromycin; A-Azithromycin; AMP- Ampicillin; CIP-Ciprofloxacin; AMC- Amoxycillin-clavulanate; G- Gentamycin; CTR- Ceftriaxone; V- Vancomycin; LZ-Linezolid									

As for gram negative bacilli, E. coli showed 67% resistance to cefotaxime ,followed by 58% resistance to ciprofloxacin, 40% resistance to azithromycin, 20% resistance to amoxycillin clavulanate and 22% resistance to Piperacillin-tazobactum. Amikacin, Ceftazidime and Cefoperazone- sulbactum were 100% sensitive to E. coli.

Regarding resistance pattern shown by Klebsiella, 88% resistance was shown to Amoxicillin clavulanic acid, 80% resistance was shown to both Azithromycin and Cefotaxime, 78% resistance to Ciprofloxacin, 72% resistance to Ceftazidime, 45% resistance to Amikacin, 8% resistance to ceftazidime-sulbactum and 4% resistance to Imipenem. Cefoperazone-sulbactum and Piperacillin- tazobactum were 100% sensitive to Klebsiella.

Pseudomonas spp showed 65% resistance to amoxycillin clavulanate, 50% resistance to azithromycin, 46% resistance to ciprofloxacin, 14% resistance to Amikacin, 10% resistance to Ceftazidime, 5% resistance to Cefotaxime and Ceftazidime-sulbactum each. It was 100% sensitive to Cefoperazone-sulbactum, Imipenem and Piperacillin-tazobactum. Regarding sensitivity to Acinetobacter, it showed 100% sensitivity to Cefotaxime, Cefoperazone-sulbactum and Imipenem.

Regarding resistance pattern of Proteus spp, 81% resistance was shown to Amoxycillin clavunate, 72% resistance was shown to Amikacin, 68% resistance to Ciprofloxacin, 48% resistance to Cefotaxime, 46% resistance to azithromycin, 30% resistance to Ceftazidime. Piperacillin-tazobactum and Imipenem showed 100% sensitivity to Proteus.

Table-III

Antibiotic Resistance Pattern of Gram Negative Bacilli (% of Resistance)					
	Escherichia Coil	Klebsiella spp.	Pseudomonas aeruginosa	Acinetobacter spp.	Proteus spp.
AK	-	45	14	30	72
AMC	20	88	65	86	81
AZ	40	80	50	48	46
CFT	67	80	5	-	48
CTZ	-	72	10	80	30
CZS	3	8	5	11	-
CFS	-	-	-	-	25
CIP	58	78	46	46	68
IMP	7	4	-	-	-
PTZ	22	-	-	12	-
AK- Amikacin; AMC- Amoxyclav; AZ- Azithromycin; CFT-Cefotaxime; CTZ- Ceftazidime; CZS- Ceftazidime/ Sulbactum; CFS- Cefoperazone/ Sulbactam; CIP- Ciprofloxacin; IMP-Imipenem; PTZ- Piperacillin/ Tazobactam					

DISCUSSION

In our study the prevalence of aerobic vaginitis is 68.33%. Cheng et al. and Razzak et al., observed higher prevalence of aerobic vaginitis i. e. 80% and 95.45% respectively (10,11). In this study bacterial vaginosis is followed by candidiasis then trichomoniasis as the leading cause of aerobic vaginitis. This finding is in accordance with other studies(12).

Microbiological evaluation of vaginitis showed preponderance of gram negative organisms over gram positive organism. Among gram-negative bacilli commonest isolate was E. coli (29.26%) then Klebsiella spp (14.63%) which concur with previous studies (13). Donders also stated the causes of vaginitis as E. coli, Enterococci, Staphylococcus spp., and E. coli was cited as one of the most common causes of this vaginitis(14). S. aureus was the most prevalent isolated pathogen among gram positive cocci with 23.17% isolates. Zarbo et al. also reported high prevalence of S. aureus with 27.9% isolates(15).

Furthermore in our study, Gram positive isolates showed 100% sensitivity to Vancomycin and Linezolid then maximum sensitivity to amoxicillin clavulanate which is in accordance with previous studies done(16). Among Gram negative isolates E. coli and Klebsiella spp showed maximum resistance to Amoxicillin clavulanate, Cefotaxime, Ciprofloxacin. They showed higher sensitivity to Imipenem (93% and 96% respectively) and Piperacillin-tazobactum (78% and 100% respectively). Mumtaz et al. showed the most effective chemotherapeutic agents against Gram negative rods were Imipenem with upto 100% sensitivity and Piperacillin-tazobactum as upto 95.8% sensitivity(17).

CONCLUSION

The prevalence of vaginitis was relatively high and was affected by individual hygiene. Therefore, comprehensive health care education aimed at reducing vaginal infection is needed. Isolation and identification of aerobic bacteria along with its antibiotic sensitivity pattern is needed to reduce the prevalence of the disease.

REFERENCES

1. K. Lakshmi, S. Aishwarya Chitralekha Jr., and G. A. Menezes, "Review on infectious vaginitis," Research Journal of Pharmaceutical, Biological and Chemical Sciences, vol. 4, article 679, 2013.
2. E. F. C. Murta, A. O. Silva, E. A. C. Silva, and S. J. Adad, "Frequency of infectious agents for vaginitis in non- and hysterectomized women.," Archives of gynecology and obstetrics., vol. 273, no. 3, pp. 152156, 2005.
3. REDONDO-LOPEZ, V., COOK, R.L. & SOBEL, J.D. (1920). Emerging role of lactobacilli in the control and maintenance of the vaginal bacterial microflora. Rev Infect Dis, 12, 856-872.
4. Varghese S, Padmaja P et al, Ind. J. of pathology and microbiology, Vol. (3), No. 44, page 313-314; July 2001
5. R. P. Nugent, M. A. Krohn, and S. L. Hillier, "Reliability of diagnosing bacterial vaginosis is improved by a standardized method of gram stain interpretation," Journal of Clinical Microbiology, vol. 29, no. 2, pp. 297301, 1991.
6. N. E. Kurewa, M. P. Mapingure, M. W. Munjoma, M. Z. Chirenje, S. Rusakaniko, and B. Stray-Pedersen, "The burden and risk factors of Sexually Transmitted Infections and Reproductive Tract Infections among pregnant women in Zimbabwe," BMC Infectious Diseases, vol. 10, article 127, 2010.
7. Kent HL. Epidemiology of vaginitis. Am J Obstet Gynecol 1991;165:1168-76.
8. Dan M, Kaneti N, Levin D, Poch F, Samra Z. Vaginitis in a gynecologic practice in Israel: Causes and risk factors. Isr Med Assoc J 2003;5:629- 32.
9. Syed TS, Braverman PK. Vaginitis in adolescents. Adolesc Med Clin 2004;15:235-51.
10. Cheng L, Wang JY. The vaginal micro-flora of aerobic vaginitis and bacterial vaginosis. Zhongguo Wei Shengt Axixue Za Zhi 2009;21:1107- 9.
11. Razzak MS, Al-Charrakh AH, Al- Greitty BH. Relationship between lactobacilli and opportunistic bacterial pathogens associated with vaginitis. N Am J Med Sci 2011;3:185-92.
12. Xueqiang F, Zhou Y, Yanfang Y, Yutao D, Huiqing L. Prevalence and risk factors of trichomoniasis, bacterial vaginosis and candidiasis for married women of childbearing age in rural Shandpong. Jpn J Infect Dis. 2007;
13. Pal K, Sidhu SK, Devi P, Malhotra S, Malhotra A, Soneja S. Etiology of vaginal infections and antimicrobial resistance pattern of aerobic bacterial isolates in women of reproductive age group attending a tertiary care hospital. Asian Pac. J. Health Sci., 2017; 4(4):15- 18.
14. Donders GG, Van Calsteren K, Bellen G, Reybrouck R, Van den Bosch T, Riphagen I, et al. Predictive value for preterm birth of abnormal vaginal flora, bacterial vaginosis and aerobic vaginitis during the first trimester of pregnancy. BJOG 2009;116:1315-24.
15. Zarbo G, Coco L, Leanza V, Genovese F, Leanza G, D'Agati A, et al. Aerobic vaginitis during pregnancy. Res Obstet Gynecol 2013;2:7-11.
16. Nahar D, Soni G, Chand AE, Mourya S. Bacterial etiology and their antibiogram in aerobic vaginitis patients at tertiary care hospital, Kota, Rajasthan. Int J Sci Stud 2016;4:103- 7.
17. Mumtaz S, Ahmad M, Aftab I, Akhtar N, ul Hassan M, Hamid A. Aerobic vaginal pathogens and their sensitivity pattern. J Ayub Med Coll Abbottabad 2008;20:113-7.